WHAT IS CLAIMED IS:

1. A method of improving color image data, comprising the steps of:

a) placing over a unit area a predetermined pattern of color-component specific filter elements on a single plane in a sensor, each of the color-component specific filter elements filtering a predetermined color-component over one of sub-unit areas in the unit area;

b) sampling color image data for the unit area using the color-component specific filter elements, a portion of the color image data being sampled only through a corresponding one of the color-component specific filter elements for a corresponding one of the sub-unit areas;

c) generating chroma values for each of the color-component specific elements from the color image data;

d) adjusting the chroma values according to the specific pattern of the color-component specific elements; and

e) estimating an intensity value based upon the chroma values adjusted in said step d) and the color image data from said step b).

2. The method of improving color image data according to claim 1 further comprising the additional steps of:

f) further adjusting the chroma values for an improved color characteristic between said step d) and said step e).

g) adjusting the intensity value for an improved edge characteristic after said step e); and

h) generating RGB data based upon the chroma values adjusted in said step f) and the intensity value adjusted in said step g).

3. The method of improving color image data according to claim 2 further comprising an additional step i) of gamma converting the RGB data after said step h).

4. The method of improving color image data according to claim 1 wherein the color image data is in a RGB data format in said step a).

5. The method of improving color image data according to claim 4 wherein said step a) uses a first predetermined matrix for converting the color image data to the RGB data format.

6. The method of improving color image data according to claim 5 further comprising an additional step j) of gamma converting the RGB data.

7. The method of improving color image data according to claim 5 wherein said step d) uses a second predetermined matrix for converting the RGB data to the chroma values.

8. The method of improving color image data according to claim 7 wherein said first matrix and said second matrix are combined into a third matrix to be applicable in an additional step for replacing said step a), said step b) and said step c).

9. The method of improving color image data according to claim 1 wherein said step d) adjust the chroma values based upon a predetermined filter.

10. The method of improving color image data according to claim 7 wherein the intensity in said step e) has a range

equal to all of the color-component specific photo elements in the sensor.

11. The method of improving color image data according to claim 10 wherein the intensity in said step e) is determined based upon following equations:

$$Y = Y_0\,CCD1 + Y_1\,C_r + Y_2\,C_b$$

$$Y_0 = -C_G / C$$

$$Y_1 = (R1\,C_G - G1\,C_R)/C$$

$$Y2 = (B1\,C_G - G1\,C_R)/C$$

$$C = -G1 + G1\,C_R - R1\,C_G - B1\,C_G + G1\,C_B$$

where Y is intensity of one of the color-component specific elements; CCD1 is a color image data value from a predetermined photo sensor element; C_r and C_b are the chroma values; R1, G1 and B1 are a portion of the first matrix; C_R, C_B and C_G are predetermined constants.

12. A system for improving color image data, comprising:

a single-plane color image sensor having a predetermined spatial pattern of color-component specific photo elements on a single plane for generating color image data, each of the color-component specific filter elements filtering a predetermined color-component over one of sub-unit areas in a unit area, said single-plane color image sensor sampling the color image data for the unit area using the color-component specific filter elements, a portion of the color image data being sampled only through a corresponding one of the color-component specific filter elements for a corresponding one of the sub-unit areas;

an interpolated chroma value generator connected to said single-plane color image sensor for generating interpolated chroma values according to the spatial pattern; and

an intensity estimator connected to said interpolated chroma value generator and said single-plane color image sensor for estimating an intensity value based upon the interpolated chroma values and the color image data.

13. The system for improving color image data according to claim 12 wherein said interpolated chroma value generator further comprises a color-component specific spatial filter for interpolating the color image data and a convertor for converting the color image to the chroma values.

14. The system for improving color image data according to claim 12 further comprising a smoothing filter connected between said interpolated chroma value generator and said intensity estimator for reducing an error amount in the color image data.

15. The system for improving color image data according to claim 14 further comprising an edge enhancement filter connected to said intensity estimator for enhancing an edge.

16. The system for improving color image data according to claim 15 further comprising a RGB converter connected to said smoothing filter and said edge enhancement filter for generating a set of RGB data.

17. The system for improving color image data according to claim 12 wherein said single-plane color image sensor is one dimensional.

18. The system for improving color image data according to claim 12 wherein said single-plane color image sensor is two-dimensional.

19. The system for improving color image data according to claim 18 wherein said single-plane color image sensor is at least three by three of said color-component specific photo elements.

20. The system for improving color image data according to claim 14 wherein said smoothing filter is a median filter for outputting a median value.

21. The system for improving color image data according to claim 14 wherein said smoothing filter is a low-pass filter for outputting a median value.

22. The system for improving color image data according to claim 12 wherein said intensity estimator estimates the intensity value in a range equal to all of the color-component specific photo elements in said single-plane color image sensor.

23. The system for improving color image data according to claim 22 wherein said intensity estimator estimates the intensity value based upon following equations:

$$Y = Y_0\, CCD1 + Y_1\, C_r + Y_2\, C_b$$

$$Y_0 = -C_G / C$$

$$Y_1 = (R1\, C_G - G1\, C_R)/C$$

$$Y2 = (B1\, C_G - G1\, C_R)/C$$

$$C = -G1 + G1\, C_R - R1\, C_G - B1\, C_G + G1\, C_B$$

where Y is intensity of one of the color-component specific elements; CCD1 is a color image data value from a predetermined photo sensor element; C_r and C_b are the chroma values; R1, G1 and B1 are a portion of the first matrix; C_R, C_B and C_G are predetermined constants.

24. The system for improving resolution in color image data according to claim 12 further comprising a parameter storage for storing multiple sets of parameters and a control unit connected to said parameter storage and said intensity estimator for selecting one of the sets of the parameters based upon a particular location in the spatial pattern.

25. A program storage device readable by a machine, tangibly embodying a program of instructions executable by the machine to perform method steps of reproducing a high-resolution image, said method steps comprising:

k) placing over a unit area a predetermined pattern of color-component specific filter elements on a single plane in a sensor, each of the color-component specific filter elements filtering a predetermined color-component over one of sub-unit areas in the unit area;

l) sampling color image data for the unit area using the color-component specific filter elements, a portion of the color image data being sampled only through a corresponding one of the color-component specific filter elements for a corresponding one of the sub-unit areas;

m) generating chroma values for each of the color-component specific elements from the color image data;

n) adjusting the chroma values according to the specific pattern of the color-component specific elements;

o) further adjusting the chroma values for smoothing the chroma values adjusted in said step l);

p) estimating an intensity value based upon the chroma values twice adjusted in said steps l) and m) and the color image data from said step k);

q) adjusting the intensity value for an improved edge characteristic after said step o); and

r) generating RGB data based upon the chroma values adjusted in said step n) and the intensity value adjusted in

said step p).